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## 2.3 Health security in the Barents Region

*Susanna Pääkkölä and Dorothee Cambou*

Health security constitutes a fundamental component of human security. The main goal of the present chapter is to highlight some key challenges to health and wellbeing in the Barents Region.

### 1 Definition

One of the most significant human achievements of the 20th century was progress in health and wellbeing (Commission on Human Security 2003). 'About a billion people today have average life expectancies of nearly 80 years, twice the average of a century before'. Yet, good health remains inequitably distributed (Commission on Human Security 2003, 95) and health security has acquired a renewed salience in the human security discourse (Elbe 2010, 101).

According to the Commission on Human Security, 'good health is both essential and instrumental to achieving human security' (2003, 96) because the very purpose of security is protecting human lives (Elbe 2010, 101). In this regard, health security is linked to unnecessary deaths that can be prevented by better health behaviour or by reaching people trapped in poverty or conflict (Commission on Human Security 2003, 95). The Commission on Human Security identifies global infectious diseases, poverty-related threats, and violence and crisis as three major health challenges. However, health is not only defined the absence of disease or death. According to the Commission on Human Security, health also includes 'a state of complete physical, mental and social well-being'. It integrates mental health and physical health as well as subjective psychosocial wellbeing and confidence about the future, which results in a more holistic approach to disease prevention and health promotion (Commission on Human Security 2003, 95).

Therefore, assessing health security goes beyond measuring morbidity and mortality. It includes an assessment of how people perceive their own health and the trajectory of their lives. The achievement of health security also takes into account interrelated issues including pre-existing health, work, economic and family situations. For instance, it takes into consideration that higher living standards are associated with decreased risks of disease, illness and

injury, better immune functioning, speedier recovery and increased longevity. It also considers factors that increase life expectancy such as good nutrition, physical exercise and safe sex. Finally, it also includes psychological wellness and the capacity for 'people to exercise choice, pursue social opportunities and plan for their future' (Commission on Human Security 2003, 96).

At the international level, there are different indicators to evaluate health security. Under the United Nations Indicators of Sustainable Development (United Nations 2007, 11), which serves as reference for countries to develop or revise national indicators of sustainable development, health security is determined through four core indicators:

- 1 Under-five mortality rate (life expectancy at birth and healthy life expectancy at birth),
- 2 Health care delivery (percentage of population with access to primary health care facilities, contraceptive prevalence rate and immunisation against infectious childhood diseases),
- 3 Nutritional status (nutritional status of children) and
- 4 Health status and risks (morbidity of major diseases such as HIV/AIDS, malaria, tuberculosis and prevalence of tobacco use).

While these indicators are helpful in assessing a quantitative perspective of health security, they are limited in their ability to measure what people think and feel about their lives. The individual wellbeing of peoples is often expressed in relative terms, and is also connected to personal judgements of life satisfaction and feelings ranging from depression to joy. Access to healthcare and services to promote wellbeing are also nuanced by specific individual needs associated with gender, sexual orientation, age, culture and disability. Furthermore, while health insecurity concerns us all, certain vulnerable groups of people are disproportionately affected. In its report on human security, UNDP highlights that 'in both developing and industrial countries, the threats to health security are usually greater for the poorest, people in the rural areas and particularly children' (UNDP 1994, 28). In this regard, health insecurities are relative and dependent on the infrastructure and demographics of the region, and therefore must be contextualised. Finally, in the age of global migration, health concerns are no longer isolated national issues, but require regional and cross-border considerations. This situation also calls for an assessment of the specific needs of minorities and indigenous populations, and communities beyond national majorities.

## **2 Contextualisation**

In the Barents, challenges to healthcare differ substantially in each respective country.

In both Finland, Norway, Sweden and the Russian part of the region, the organisation of the health service is affected by the fact that this is a very

sparsely populated area with long distances, for which reason the health service provided differs significantly from the health service provided in the more densely populated areas of the countries.

(JWGHS Statistic Working Group 1998)

In addition, population demographics and vital statistics between the three Nordic countries and Russia vary substantially. Whereas the population in the Finnish, Norwegian and Swedish parts of the Barents Region share close similarities, the population in the Russian part differs significantly (JWGHS Statistic Working Group 1998).

In particular, mortality rates vary significantly in the Barents Region. Fennoscandia has the lowest mortality rate in the world, whereas in the Russian Barents Regions the rates are relatively high. In 2014, mortality rates varied from around 8% (total deaths) in the North Ostrobothnia/Troms regions to roughly 14% in Karelia and Arkhangelsk (Emelyanova and Rautio 2016, 7). In addition, significant cross-regional differences in mortality are shown in the differences in life expectancy at birth for males/females. First, life expectancy for the men living in regions belonging to the Nordic countries is higher than for those living in Russia. In 1998, it was noted that men from the Nordic countries could expect to live 12 to 15 years longer than their Russian counterparts, whereas the women in the Nordic countries could expect to live around 10 years longer than their Russian counterparts (JWGHS Statistic Working Group 1998). In addition, 'in the Norwegian, Swedish and Finnish regions, women live significantly longer than men' (BEAC 1998). This data has not seen significant changes in the past two decades. In 2014, it was noted that life expectancy was 63 for women and 76 for men in Karelia, compared to 80 for men and 83 for women in Vesterbotten (Emelyanova and Rautio 2016, 7). Finally, the respective regional life expectancies of both men and women in the Barents Regions (the northern areas of each country) are slightly lower than the respective national averages in Norway, Sweden and Finland.

Beyond mortality rates, diseases patterns and causes of death vary across the region. Twenty years ago,

prostate cancer and cancer of the bladder were most widespread in the Norwegian and Finnish regions, whereas cancer of the stomach was most widespread in the Russian regions. The same applies to cancer of the respiratory organs, which was also very high for the Finnish region. Cancer of the mouth and esophagus was most prevalent in the Murmansk and Arkhangelsk regions.

(JWGHS Statistic Working Group 1998)

In 2016, reported causes of death in Barents Region have changed. Currently, the most common are cardiovascular diseases (Emelyanova and Rautio 2016, 7). Russia leads with the highest number of deaths, resulting from general heart

diseases but also from malignant neoplasms. In comparison, the situation is different in the Troms and Finnmark regions, where respiratory diseases as well as accidents and violent deaths are the main causes of mortality (Emelyanova and Rautio 2016, 8). But, these are quite rare in Sweden, where the highest cause of disease-related death is provoked by cancer, especially lung cancer for men and breast cancer for woman. A similar situation exists in Finland, where alcohol poisoning is also a major factor of disease-related deaths (Emelyanova and Rautio 2016, 8).

In the Barents, indigenous peoples, Sami, Nenets and Vepsians are also the most vulnerable peoples and face a number of health challenges. For instance, in Russia, it is noted that 'Vepsians have poorer health compared to the non-indigenous people residing in the Barents Russia' (Emelyanova and Rautio 2016, 9). By comparison, mortality rates of the Sami in Finland are similar to the national mortality rate. On the other hand, mortality rates were lower in the 1980s for Sami in Finland, but rates have shifted over the last 30 years to become similar to the rest of the country and other Barents territories (Emelyanova and Rautio 2016, 9). More specifically, 'cancer rates were especially low, however they are now equal to the average values in Finland and Lapland' (Emelyanova and Rautio 2016, 9). According to Emelyanova and Rautio, 'this may be caused by changes in the habits and living environment of the Sami occurring in the period from 1970s up to nowadays, which are now similar to the majority of Finnish and western populations' (Emelyanova and Rautio 2016, 9). However, further analysis and data are needed in order to reach any substantial conclusions. Additionally, 'mortality due to accidents and violence is also significantly higher for the Sami than the national average. Non-fatal accidents and suicide attempts are also more common for Sami males' (Emelyanova and Rautio 2016; Soininen 2015). Finally, indigenous peoples in the Barents Region are also among peoples who face the highest number of suicides, especially in Nenets areas where the suicide rate for Nenets is significantly higher than the non-indigenous rate (Sumarokov et al. 2014). These differences have been partly explained by 'a lack of a "sense of indigenous belonging", lack of cultural identity and problems of resilience', being single or divorced, and having lower education (Sumarokov et al. 2014; Emelyanova and Rautio 2016, 10). The high levels of suicide in the Barents Region among indigenous peoples are also more broadly reflected in global trends that note 'indigenous people around the world have the highest suicide risk of any identifiable cultural (or ethnic) group' (Leenaars 2006).

In the Barents Region, certain climate factors affect the health and wellbeing of the Barents population differently than the national population. Seasonal statistics for morbidity show for instance 'that more deaths occur in the winter (cardiovascular, respiratory, circulatory, and skin diseases), and there are more traumas (frostbite and hypothermia) associated with cold weather' (Emelyanova and Rautio 2016, 10). In northern Sweden, it was also observed that 'a one-degree increase in temperature has led to a steep rise in the number of cases of non-lethal, acute myocardial infarction,

and other heart dysfunctions' (Messner et al. 2002; Emelyanova and Rautio 2016, 8).

Thus, notwithstanding the marked differences between the Nordic and Russian parts of the region, the Barents Region is impacted by unique regional circumstances that influence the wellbeing of its population. The cold, humid and dark ambient environment in the Barents Region can make work and life more demanding for inhabitants, especially for individuals with disabilities or existing health issues. Long travel distances in the Barents Region outside urban areas also increase the costs of health care, disaster prevention and rescue services. In addition, the impact of environmental pollution and climate change has been the main focus of recent projects regarding health security challenges faced by the Arctic population. The Arctic Monitoring and Assessment Programme (AMAP 2014) and the EU-funded research project Arctic Health Risk (ArcRisk 2013) have monitored health security risks in relation to climate impacts (extreme temperatures, water scarcity, flooding, sea level rise, droughts, storms and ice and snow cover changes) and environmental contaminants. In the Barents Region, there have also been intensive efforts to enhance research and cooperation in order to address issues related to health and wellbeing in relation to the impact of the changing environment.

In order to strengthen health and wellbeing in the Barents Region, a working group on health and social issues has also been created under the auspices of the Barents cooperation. Established in 1996, the role of the Joint Working Group on Health and Related Social Issues (JWGHS) is to improve the public health and social wellbeing of peoples in the Barents Region. The JWGHS 'provides a political structure for health and social cooperation, in which representatives of the national and regional health authorities of the Barents countries meet twice a year to discuss relevant issues' (JWGHS 2017c). In its programme, the prioritised areas of intervention include the prevention and control of communicable diseases and non-communicable diseases, including work on the reduction of lifestyle-related risk factors, environmental factors and new emerging risks. Other priorities areas also concern the strengthening of health systems and social services with relevance for health in the Barents (JWGHS 2016, 2). These reflect the main challenges faced by the Barents population today and are highlighted in the following part of this assessment.

### **3 Assessment**

The purpose of this assessment is to highlight several of the specific and distinct health security risks that face the Barents population. Specifically, the analysis allows focuses on the impact of different phenomena that affect the health and wellbeing of the Barents population such as the impact of the unique Barents climate and environment, industrial pollution and new environmental, social and economic changes.

### **3.1 Climate conditions and remoteness**

The Arctic-Barents Region possesses a unique climate and a specific environment, where access to health care in remote areas can be difficult and affect the wellbeing of its population.

In the Barents Region, cold climate and darkness during the long wintertime is a challenge for the people living and working in the area. Cold ambient temperature can expose individuals to significant health risks. Cold sensations can be painful and cold exposure can worsen symptoms of some medical disorders (Parsons 2003; Rintamäki 2007a; Rintamäki 2007b). Body cooling under 35°C is associated with the range of physiological responses and dysfunctions (Parsons 2003). Working and surviving in demanding circumstances in cold, humid and dark ambient environments can require great effort, especially when a person has existing health problems.

In addition, cold weather and lack of light in wintertime can also have indirect effects on mood and cognition, which in turn effect the pineal and thyroid hormones that control psychological factors (Parsons 2003). Finally, accidental hypothermia, accidents and cold injuries also increase mortality in cold regions. This is particularly challenging for elderly people, whose thermoregulatory mechanisms may be weakened (Mallet 2002, 776). Finally, it can be noted that the cold ambient temperatures, wind, ice and snow conditions in the Barents add additional logistic challenges for health care authorities and rescue services to operate.

The sparsity and spread of populations in the Barents Region also has an impact on access to healthcare. In the northern parts of the Nordic countries and the Russian Barents Region, 'the organisation of the health service is affected by the fact that this is a very sparsely populated area with long distances' (BEAC 1998, 8). Consequentially, primary health care treatment in the Barents Region is predominantly centralised, where specialised treatment is only available through hospitals in concentrated urban areas (BEAC 1998, 8). This means that patients must sometimes travel long distance to receive necessary health care. Conversely, doctors may also travel long distances to visit their patients. For example, in the Yamalo-Nenets Autonomous region in Siberia, medical personnel sometimes travel to meet patients living in the tundra region (Pääkkölä 2013). In addition, emergency response times in remote areas are longer than in urban areas, and are exacerbated by harsh weather conditions. Delays in response time can occur when there are longer distances between hospitals in urban centres and emergencies in remote areas. Access to health care and emergency services in such remote areas depend directly on transportation capacities: helicopters, ambulances, snowmobiles, boats and ships.

On the other hand, there are solutions to mitigate the regional health impacts faced by the Barents population. First, the digitalisation of the health care sector, telehealth services and telemedicine can provide more equitable access and opportunities for all health care users. The development of portable equipment, measurement tools and facilities to support such digitalisation can

also extend good quality e-health services to rural areas. However, training for emergency responders to use these new tools and methods is necessary in order to ensure their utility. In addition, while the development of new technologies, automations, the internet of things, 3D printing and other innovations are enticing, their impact on everyday life in the Barents is still relatively low. In this regard, it can be argued that more resources need to be allocated to develop future ICT-based services in relation to healthcare sectors.

Furthermore, cross-border cooperation among the Barents countries is an important means to solve challenges to healthcare in the region, especially in securing access to healthcare for communities in remote areas. Today, the establishment of the Joint Committee on Rescue Cooperation in the Barents Region

makes it possible to provide assistance more efficiently, faster and at lower operating cost. Under the auspices of this cooperation, direct access to additional resources and specialised functions in neighbouring countries can be assured and preparedness and prevention measures can be co-ordinated.

(BEAC 2017)

Yet, because of many new challenges such as climate change, it is also noted that Barents representatives should ‘be aware and prepare for the need for enhanced cooperation in the Barents Region’ (BEAC 2016). Among these challenges, the impacts of climate change and environmental pollution are threats that can directly affect the immediate and long-term health of the Barents population.

### ***3.2 Environmental pollution – regional and transboundary contaminants***

Regional and transboundary pollution represents other sources of health insecurity in the Barents Region. The Arctic, including the Barents, is contaminated by chemicals released as a result of both human activities and natural processes (e.g., AMAP 2011, Sundseth 2015, 3581). These chemicals reach the Arctic from regional and distant sources via the atmosphere and via northerly flowing rivers and ocean currents. Long-range transportation of the chemical contaminants as well as the presence of local contaminants cause a risk to the environment and affect human health in the Barents areas (see also Chapter 2.1). More specifically, environmental contaminants include a number of Persistent Organic Pollutants (POPs) (AMAP 2004) and mercury (AMAP 2011), which have been proven to affect human health. In general,

because they can be transported by wind and water, most POPs generated in one place or country can and do affect people and wildlife far from where they are used and released. They persist for long periods of time in



the environment and can accumulate and pass from one species to the next through the food chain.

(Girard 2010, 404)

Concerning the impact of contaminants on human health, it can generally be stated that certain environmental pollutants can adversely affect the development of the immune system (AMAP 2015, 97). In the Russian Barents, industrial pollution has also been linked to an increase in mortality caused by respiratory problems, cardiovascular and circulatory diseases, and cancer (Nieminen et al. 2013; Norseth 1994, 106–107; Revich 1995). Other studies have shown that toxic agents and pollutants, such as organochlorine contaminants (OC), may have negative effects on human body and even increase obesity and diabetes (Lee et al. 2007; Longnecker et al. 2001; Longnecker and Daniels 2001; Kristiansen and Frøyland 2010; Son et al. 2010). The ArcRisk project (2013) has also studied the impacts of environmental contaminants and the complex relationships between sources, transport, bioaccumulation and exposure of contaminants on human health in the Arctic. Its conclusions indicate that human dietary exposure to harmful contaminants like PCBs, DDTs and HCHs has decreased lately due to the decrease of contaminants in environmental levels but also due to changes in dietary habits (AMAP 2014, 10–14). Nevertheless, global emissions of mercury as well as newly emerging contaminants still pose problems, especially for people living in the coastal communities (AMAP 2014, 10).

One of the worrying implications of transboundary pollution also concerns its impact on maternal and child health. Persistent toxic substances like mercury or like polychlorinated biphenyls and pesticides may threaten the health of the unborn and children (AMAP 2015). It has been demonstrated that mercury can affect the reproductive, immune and neurological systems and even the cardiovascular systems (AMAP 2011, 165). The impact of pollutants on unborn and newborn health occurs through the passing of Persistent Organic Pollutants (POPs) in the food chains and breast milk. Breastfeeding is highly recommended as primary food for infants (WHO, n.d.). However, if the human milk contaminant burden increases alongside the presence of Arctic pollutants and toxic chemicals in food chains in fish or mammals, the practice of breastfeeding may become a more complex public health issue. In particular, this could be a major concern among indigenous peoples living in tundra environment in Russia, far from the other modern food supplies (see also Chapter 2.4). In this regard, further research and general awareness for the complexity of the impacts of increasing contaminant burdens in the Arctic and Barents Region are needed.

Finally, apart from its toxicological risks, the perception and knowledge of potential risks associated with contaminants in the environment can also adversely ‘turn people away from traditional/local foods, even when they represent the most healthy food choice’ (AMAP 2011, 164). As noted in the 2011 AMAP report, ‘this can lead among other things, to a degradation of

cultural identity, economic stress arising from the high cost of healthy store-bought foods, and potential nutritional deficits arising from the consumption of poor quality store-bought foods'. Thus, pollution in the Barents Region can have a more broad and indirect impact on the health and wellbeing of its population, especially in regards to communities with specific traditional foods such as indigenous communities.

Ultimately, continuous research is needed to understand how environmental pollution affects the health of peoples living in the North, especially in the Barents-Arctic where more data should be collected to understand the current impact of pollution on the human health of the population. In any event, there is a need to reduce contaminant levels and pollution through local, national, regional and international actions and initiatives (AMAP 2011, 167–169).

### ***3.3 Environmental, economic and social changes***

Ecosystem disturbance and changing interactions between wildlife and humans can lead to the spread of new pathogens. Today, worldwide, there is an apparent increase in many infectious diseases, including newly circulating ones. This reflects the combined impacts of rapid demographic, environmental, social, technological and other lifestyle changes that affect both physiological and mental wellbeing.

#### ***3.3.1 Antibiotic resistant microbes and virus***

The presence of, and risk posed by, antibiotic resistant microbes in the Arctic are increasing (European Center for Disease Prevention and Control 2017). In the Barents Region, biological factors such as mutations in bacteria and the development of the super bacteria have resulted in the presence of multi-drug resistant tuberculosis bacteria in Russia and in neighbouring parts of Finland (Casali et al. 2014, JWGHS 2012). Thus, according to the Joint Working Group on Health and Related Social Issues (JWGHS), 'the epidemiological situation regarding tuberculosis in the Barents Region is rather controversial ... and its threat is increasing ...' (JWGHS 2012, 4).

Specifically, tuberculosis (TB) incidence in the Nordic countries is among the lowest in the world, which, however contrasts with Russia, which is classified as one of the high-priority countries for TB by WHO. In Finland, the incidence of tuberculosis is low, but the risk of TB resistance is increasing, especially among foreign nationals. In 2015, all children who contracted TB were of foreign origin, and other adult patients were reported to be foreign in 105 cases (39%), up by one-fifth year-to-year (Jaakola et al. 2015, 44). According to Jaakola, 'the growing numbers of asylum seekers were probably one of the contributing factors to this trend' (Jaakola et al. 2015, 5). As a consequence, Finland has started to carefully check the health of newcomers as a preventative measure. Although it is unclear how this trend affects more

specifically the Barents part of Finland, it is certainly an issue that affects this part of the country as well.

Unlike Northern Europe, where TB is mostly registered among immigrants and elderly people, 'the epidemic process in Russia penetrates into various population layers, becoming a problem not only of vulnerable groups, but also of socially advantaged ones' (JWGHS 2012, 4). Due to this situation, control over TB has been restored in the country, which has allowed a stabilisation in TB incidence, prevalence and mortality in the last years, with a tendency to improve the epidemic situation (JWGHS 2012, 4). Nonetheless, the JWGHS has suggested taking measures to prevent the spread of tuberculosis and HIV&TB co-infection in the Barents Region through intensive international collaboration and to develop guidelines, standards and infectious control programs for the Russian part of the Barents Region (JWGHS 2017a). In addition, and among other measures, the working group has also been advised 'to improve the implementation of the existing plans for infection control', 'to introduce earlier and more accurate diagnostics of TB and MDR TB' and 'to improve capacities of facilities and institutions' (JWGHS 2017b).

Another area of significant concern in the Barents Region is the Human Immunodeficiency Virus (HIV). In 2013, 6,472 new cases of HIV infection were reported in eleven territories of the Northwestern Federal District of Russia. Although the number of cases had decreased from 2.1% since 2012, an increase in the number of new HIV cases was reported in four areas of the North-western Federal District: Arkhangelsk (by 15.2%), Vologda (by 12.1%), Pskov (by 7.4%) and Murmansk (by 2.8%) regions (JWGHS 2015, 9). 'Since the beginning of the epidemic in 1989, the number of officially registered HIV cases in the NWFD total 102,623. During the same period, 17 283 people have died' (JWGHS 2015, 15). As the HIV epidemic continues to spread in the Barents Region of Russia under some notable trends (JWGHS 2015, 15), a better action program is urgently needed to tackle the issue. Yet, in its 2015 report, the JWGHS indicates that 'a part of the population still has improper awareness about HIV/AIDS' and that 'the coverage of the harm reduction programs remains modest'. In addition, there is a lack of funding for awareness and harm reduction programmes, which constitutes a major hurdle in addressing the epidemic (2015, 16).

By comparison, the HIV infection rate reported in all three Nordic countries is relatively stable, and the total number of diagnoses by doctors in Norway is even in decline (JWGHS 2015). In all cases reported in the Nordic countries, foreigners and newly arrived migrants represent more than half of the diagnosed patients (JWGHS 2015, 13). In this regard, the JWGHS has underlined 'the importance of developing efforts and methods to reach migrants, for HIV preventive work, with information and to offer counselling and testing' (JWGHS 2015, 15). Overall, prevention programmes and policy support are needed across the Barents to address the spread of infectious diseases such as HIV.

### 3.3.2 Zoonotic, new and hidden diseases

The apparition of new species in the Arctic, such as new insects also raises health concerns. New zoonotic diseases may emerge in the Barents Region in the future (Revich et al. 2012). Many blood-sucking insects can act as vectors for microbes, and transmit diseases to humans and animals via bites such as mosquitoes and flies. Rising tick populations in the Barents are an on-going concern (Evengård and McMichael 2011; Sormunen et al. 2016; Jääskeläinen et al. 2016). In Russian Karelia it has been reported in 2012 that the incidence of Tick Borne Encephalitis disease remains high and the incidence in the republic is two to three time higher than the incidence for the country as a whole (EpiNorth 2016). Tularemia, another zoonotic disease caused by the bacteria *Francisella tularensis*, is also an issue of concern in the northern part of Finland and the number of human cases of tularemia increased significantly in Sweden between 1984–2012 (Rossow 2015; Furberg 2016).

Additionally, temperature changes around the globe are pushing human pathogens towards the Arctic, raising many new risks for peoples. Previous studies suggest that the climate change will affect the relationship between regional climates and allergens, especially on aeroallergens (pollen and mould spores). Climate change will have impacts on four categories of allergens – respiratory, contact allergens, plant food allergens, insect allergens (Beggs 2014, 105–113). Increasing temperatures will change the spatial patterns of parasites including house dust mites (a common allergen in the home) and birch pollen (Frei and Gassner 2008). Increased rainfalls as well as an increase in relative humidity indoors might cause difficulties in managing excess water flows in buildings and contribute to the risk of mould growth, which could impact respiratory health. Studies regarding the effects of climate change on respiratory health have been restricted to the last two decades, (Beggs 2014, 105) and there is a great need for this research to continue globally as well as in the context of the Barents Region.

Climate change is also likely to accelerate the spread of new pathogens including tropical diseases, which has led researchers to view the longstanding relationships between climate and disease with new urgency (Institute of Medicine 2008). Yet, little is known about the impact of climate change and the risk and distribution of infectious diseases in Arctic regions. According to Parkinson and Evengård (2009), damage to sanitation infrastructures and water sources caused by melting permafrost, storm surge or flooding can adversely affect water quantity and quality, and result in increased rates of respiratory and skin infections as well as diarrheal diseases caused by bacterial, viral and parasitic agents. More particularly, climate change can spread illnesses such as malaria, as rising temperatures push disease-carrying mosquitoes into new places. The tropical disease malaria, a vector-borne disease caused by the malaria parasite (*Vivax falciparum*), was a common endemic disease in Finland in the 18th and 19th centuries (Hulden and Hulden 2009). However, with global warming temperature, it is possible that the virus will resurface.

Finally, hidden diseases such as the bacteria *Bacillus anthracis* may also reappear. In fact, *Bacillus anthracis* resurfaced in 2016 and caused an epidemic amongst reindeer in the Yamalo-Nenets region of Siberia in Russia (BBC News 2016). According to many scientists, the resurfacing of hidden diseases may increase as icy environments melt and ancient microbes emerge from the ice and mix their genes with the modern microbial genomes (Katz 2012; Revich et al. 2012).

Thus, the (re)emergence of infectious diseases in the Barents Region depends on many factors. Suitable conditions for disease transmission may change with the environment and across time. However, changes in the spatial patterns of diseases remain hard to estimate, although scientists are currently studying the spreading patterns of many potential and infectious microbes that pose health risks both globally and within the Barents Region (e.g. Revich et al. 2012; Bouma and Pascual 2014).

### 3.3.3 *Risk and disasters*

Natural disasters in the Barents are rare. Nevertheless, climate change increases the uncertainty for future risks. Quick changes in weather conditions and extreme weather events due to the climate change may create new risks for the inhabitants in the Siberian tundra and in Fennoscandia (IPCC 2014). The melting of ice and permafrost will increase the difficulty in forecasting future weather patterns, and may result in increasing incidences of quickly changing cold ambient temperatures, wind, ice and snow conditions in the Barents.

The uncertainty of climate-related changes to regional weather may make it more difficult for authorities responsible for regional health care and rescue services to be prepared in the future. In this respect, strengthening cross-border cooperation among the Barents countries is important. The Arctic Council is already promoting search and rescue cooperation between to improve rescue services in the region. In 2011, it adopted the Search and Rescue Agreement (formally the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic) to coordinate international search and rescue coverage and response in the Arctic. Although the Barents Region is included in the Search and Rescue Agreement, regionally the Barents also organises rescue exercises biannually. The Barents Rescue is a collaborative exercise organised under the auspices of the Barents Joint Committee on Rescue Cooperation. It seeks educates people working in rescue services, as well as local actors in business enterprises and municipalities, and prepares them for cross-border accidents and emergencies. Both the activities of the Arctic Council and Barents cooperation are essential to prevent accidents in the Arctic, as potential emergencies may increase with environmental changes or developments in the maritime and industrial sectors.

While the impacts of climate change are difficult to assess comprehensively, extreme weather and environmental changes can have serious impacts on the health and wellbeing of people living in the Barents, especially because many

of the residents' livelihoods are connected to nature. Ultimately, further research to understand new phenomena and avenues to address potential changes collaboratively are needed.

### *3.3.4 Physiological and mental wellbeing*

Alongside environmental changes, societal changes linked with the impact of the market economy and globalisation impacts the human security of peoples living in the Barents, including their health.

In particular, significant changes in diet through the decrease in traditional food uses and increase in the use of imported food are both factors in increasing food and health insecurities. Various nutrition related problems have been observed in the Arctic, and the effects of changing diets on health are being investigated through scientific research in many countries worldwide (AMAP 2011; Sharma et al. 2010). For instance, the incidence of obesity, increased body weight and chronic diseases including diabetes and cardiovascular diseases are growing in the circumpolar Arctic. Obesity is a major contributor to the global burden of chronic diseases and disabilities and is closely connected to serious social and psychological disorders affecting all ages and socioeconomic groups (Hansen et al. 2014). Several factors explain the increased rate of obesity including biological, genetic and epigenetic factors and cultural adaptations. Higher indoor temperatures (thermic-neutral temperatures), a lack of physical activity also decrease natural energy expenditure and can cause a higher risk of obesity. The societal shift towards more readily available high energy density foods can also contribute to increased rates of obesity. Furthermore, the shift from traditional to western foods have been linked to increased rates of obesity in Nenets communities (Hopping et al. 2010; Petrenya et al. 2014).

Furthermore, psychological health also clearly affects mental wellbeing. The resilience of the people living in the Barents, and the effect of such rapid changes on the long-term wellbeing of peoples and the human mind is still unknown. An increased sense of grief and the loss of control can cause problems in mental health and increase mental illnesses (Evengård and McMichael 2011). Suicide rates in the Northern areas are already relatively high, especially among indigenous communities, (Evengård and McMichael 2011; Bjerregaard and Larsen 2015; Young et al. 2015) and mental health services are not always easily accessible. Limited medical services in indigenous languages are also an obstacle for the use of psychiatric health care services in some areas. Finally, violence and harassment are also a growing problem in the Arctic and Barents Region (See also Chapter 2.7 on Personal Security).

## **4 Conclusion**

Health security in the Barents Region is undoubtedly evolving in response to increasing societal and environmental changes. As discussed in the previous

sections, globalisation, environmental changes and demographic shifts are keys factors affecting the health status of the Barents population. Migration, population aging, urbanisation and changing socio-economic conditions may also accelerate the emergence of the health problems induced by the changing climate and increasing extreme weather events (IPCC 2014).

Whereas the health concerns faced by peoples living in the Russian Barents may differ in scale and nature from those in the Nordic countries, the Barents population still share similar challenges. Addressing these challenges requires national and regional cooperation both to study the development of present and future health risks and to raise awareness among the population. Increased cooperation, digitalisation and new technological solutions to guarantee secured and efficient health services for all in the Barents Region are needed. In addition, holistic understandings and approaches to health security are required, in order to account for psychological, physiological and psychosocial wellbeing (Commission on Human Security 2003, 95). Finally, the lack of comprehensive data and studies concerning the present and future health issues concerning the Barents Region more specifically illuminates the need to enhance research in this field in order to improve access and adequate health care for all in the region.

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